

Our Ref. No. 042438.P064C
Express Mail No. EV339920277US

UNITED STATES PATENT APPLICATION FOR

CONTAINER AND TESTING DEVICE FOR SPORT BALLS

Inventors: Jerry Iggulden
Peter D. Lippire

Prepared by:

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(310) 207-3800

CONTAINER AND TESTING DEVICE FOR SPORT BALLS

1. RELATED APPLICATION

5 [0001] This is a continuation of co-pending application Serial No. 09/993,278 filed November 5, 2001, which is a continuation-in-part of co-pending application Serial No. 09/574,549 filed May 18, 2000, now U.S. Patent No. 6,360,613.

2. FIELD OF THE INVENTION

[0002] This invention relates generally to the field of sport balls, such as tennis balls. More particularly, the invention comprises the combination of a container for a plurality of sport balls with a device for testing the playing condition of the balls.

3. BACKGROUND

10 [0003] Tennis balls and certain other types of sport balls, such as racquetballs and handballs, are manufactured with a predetermined internal pressure, which imparts resiliency. The pressure is retained within a sphere of elastomeric material; however, the material is not perfectly impermeable. The internal pressure diminishes over time and with extended play. As the pressure diminishes, so does the resiliency of the ball, which has a deleterious effect on the playing characteristics of the ball.

15 [0004] Official organizations for tennis and other sports have established specifications for the balls used to play the respective sports. For example, the International Tennis Federation (ITF) Rules of Tennis specify that the ball shall have a bound of more than 53 inches and less than 58 inches when dropped 100 inches upon a concrete base. The Rules also specify that the forward and return deformation of the ball when placed under a load of 18 pounds shall be between .220 inch and .290
20 inch. Both of these specifications relate to the resiliency of the ball and hence to its playing characteristics. Recreational players are generally not concerned with whether or not a particular ball meets the precise specifications of an official organization. Such players are more concerned with the general playability of a ball and will often test a ball by squeezing it by hand or bouncing it on pavement. These informal tests are highly subjective. A number of devices have been proposed for
25 objectively testing sport balls, particularly tennis balls. Such devices are shown, for example, in U.S. Patent Nos. 5,222,391; 5,245,862; 5,291,774; 5,511,410; 5,567,870; 5,639,969; and 5,760,312.

[0005] Some of the prior art testing devices shown in the above-mentioned patents are intended for laboratory use, while others are intended to be used by individual players. However, all of the known prior art devices are relatively complex and, therefore, relatively expensive. Many of the devices
30 have electronic components and all have one or more moving parts. There remains a perceived need for

an inexpensive ball tester that can be provided to consumers at the time that the balls are purchased, analogous to the way that many dry cell batteries are sold with integral devices for testing the condition of the battery. Preferably, such a device would be simple to use and would be incorporated into the package in which balls are sold and stored so that the player would not be burdened with the
5 inconvenience and weight of an additional item to carry.

SUMMARY OF THE INVENTION

- [0006] The present invention provides a device for testing the playing condition of sport balls. The invention is preferably configured as a testing device in combination with a container for storing the sport balls; however, the invention may also be configured as a stand-alone testing device. In one
- 5 embodiment particularly suited for testing tennis balls, the invention comprises a generally cylindrical canister substantially similar to conventional tennis ball canisters. A ball condition test disk is inserted into the canister and supported by means on the inside wall of the canister. The disk has a base portion, which is supported within the canister, and an indicator arm. A ball is placed into the canister where it rests on the indicator arm with a portion of the ball protruding out of the open end of the canister.
- 10 When the protruding portion of the ball is pressed against a flat surface, the indicator arm is deflected, thereby giving an indication of the playing condition of the ball.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0007] **Figure 1** is a side view of a first type of combination container and tester in accordance with the present invention.
- [0008] **Figure 2** is a side view of the apparatus of **Figure 1** in a ball-testing configuration.
- 5 [0009] **Figure 3** is an end view of the testing device showing the ball condition indicator.
- [0010] **Figure 4** is a perspective view of a second type of combination container and tester in accordance with the present invention.
- [0011] **Figure 5** is a detailed view of the ball condition tester seen in **Figure 4**.
- [0012] **Figure 6** is a top plan view of the ball condition tester.

DETAILED DESCRIPTION OF THE INVENTION

[0013] In the following description, for purposes of explanation and not limitation, specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced in other
5 embodiments that depart from these specific details. In other instances, detailed descriptions of well-known methods and devices are omitted so as to not obscure the description of the present invention with unnecessary detail.

[0014] **Figure 1** illustrates a combination ball container and tester **10** in accordance with the present invention. Container/tester **10** comprises a cylindrical tube **12** closed at end **14** and a cap **16**.
10 In the case of a device for tennis balls, cylindrical tube **12** is preferably dimensioned to house three or four balls **20** as is customary. Cylindrical tube **12** is preferably made of a clear plastic material, such as PETE, of sufficient strength to maintain internal pressurization sufficient for extended storage of balls **20** prior to use. A pressure seal (not shown) is provided at end **15** of tube **12** under cap **16**. The pressure seal is removed and discarded by the consumer when balls **20** are first used.

15 [0015] Cap **16** preferably includes a plurality of L-shaped slots **30** which cooperate with protrusions **32** on cylindrical tube **12** to provide a bayonet-type fitting to retain cap **16** in place. Slots **30** may have a spiral configuration to provide a mechanical advantage when securing cap **16** in place. Alternatively, tube **12** and cap **16** may have cooperating screw threads instead of a bayonet-type fitting. Cap **16** allows container/tester **10** to be used for conveniently storing and transporting balls **20** even
20 after the pressure seal has been removed from tube **12**. Cap **16** is preferably made of a clear plastic material, but is preferably somewhat more rigid than tube **12**. Thus, cap **16** may be made of styrene, polycarbonate or similar material.

[0016] Referring now to **Figure 2**, a ball **20** is shown being tested for playing condition. The ball is placed inside cap **16** and the cap is secured over closed end **14** of tube **12** with slots **30** engaging
25 protrusions **34**. Protrusions **34** are spaced from end wall **14** so that ball **20** is slightly compressed when cap **16** is secured in place. As explained above, ITF specifications call for a forward deformation of more than .220 inch and less than .290 inch under a load of 18 pounds. Thus, if the dimensions are selected so that cap **16** compresses ball **20** by an amount in the specified range, a ball in new condition will exert a force of approximately 18 pounds against cap **16**. In order to ascertain the playing
30 condition of the ball, it is simply necessary to obtain an approximate measure of the force exerted against cap **16**. Any suitable force indicator may be used, such as, for example, a spring-operated indicator or an electronic display coupled to a pressure transducer.

[0017] In one preferred embodiment, an indicator **18** is attached to the inside of cap **16**. Indicator **18** comprises an opaque fluid enclosed within a pouch of flexible plastic. An indicator of this type is disclosed in U.S. Patent No. 3,987,699, the disclosure of which is incorporated herein by reference. When the fluid within indicator **18** is displaced as a result of pressure exerted against indicator **18** by compressed ball **20**, a visual indication of the displacement is provided. For example, the fluid may be a dark color, which in the absence of pressure completely obscures an underlying color on one wall of the pouch. When the thickness of the fluid is sufficiently reduced, the underlying color shows through. The degree to which the underlying color appears is directly related to the pressure exerted against indicator **18** and thereby provides a visual indication of the playing condition of ball **20**.

[0018] **Figure 3** is an end view of cap **16**, through which indicator **18** may be viewed. A ball in good playing condition will exert sufficient force against indicator **18** to displace the fluid therein within a central region **40**. Region **40** will thus have a different hue from surrounding region **42**. A ball in poorer playing condition will exert less force against indicator **18** and the color differentiation between regions **40** and **42** will be diminished. In addition, the diameter of central region **40** will appear reduced. A ball in very poor condition will exert insufficient force against indicator **18** to displace the fluid and the entire face of indicator **18** will appear as a solid hue.

[0019] **Figure 4** illustrates an alternative embodiment of the invention **100**. A can or canister **102** for storing a plurality, typically three, tennis balls is substantially similar to conventional tennis ball canisters. Canister **102** is preferably made of a clear plastic material, such as PETE. Canister **102** differs from a conventional tennis ball canister in that it is provided with means **104** for supporting a ball-testing disk **106**. As illustrated, supporting means **104** may comprise a circumferential rib on the interior surface of canister **102**. Alternative support means may also be employed, for example, disk **106** may be supported by a plurality of dimples or similar protrusions on the inner surface of canister **102**. Whichever means of support are employed, it is important that they protrude into the interior volume of canister **102** only enough to adequately support disk **106**, but not so much as to interfere with the movement of balls **20** throughout the volume.

[0020] Referring to **Figure 5**, ball-testing disk **106** has a generally conical shape defined by skirt portion **108**. The outer diameter of disk **106** is such that it may be easily inserted into canister **102**, but will be firmly supported by support means **104**. Disk **106** includes an indicator arm **110** with an indicator tip **112**. The indicator arm **110** has an inverted "V" shape with a relatively sharp point **111**. This provides for a small area of contact between the indicator arm and the ball being tested, thereby maximizing the deflection of the indicator arm.

[0021] Disk 106 is preferably made of a relatively rigid plastic material, such as Delrin or the like. The disk is preferably made by an injection molding process and may be engraved with a product logo, etc. Due to the generally conical shape of the disk, a plurality of the disks will naturally tend to nest and can be easily stacked in a shipping container or a dispenser for placing the disks into tennis
5 ball canisters.

[0022] Figure 6 is a top plan view of ball-testing disk 106. While the disk has a generally circular outer perimeter corresponding to the circular cross-section of canister 102, it can be seen that the sides 114, 115 of disk 106 are somewhat flattened. This facilitates the insertion of disk 106 through the opening of canister 102. The outer perimeter of disk 106 bulges outwardly slightly at 116,
10 117 and 118 to ensure that the disk will be securely supported by support means 104. These bulges also hold disk 106 in place when canister 102 is inverted. It should be noted that indicator tip 112 is set back slightly from the outer perimeter of the disk to ensure that it will not strike the support means 104 when indicator arm 110 is deflected during a test of ball condition.

[0023] Referring again to Figure 4, the playing condition of a ball 20 is tested by first placing
15 disk 106 on support means 104 and then inserting ball 20 into canister 102 to rest upon indicator arm 110. A portion of ball 20 protrudes from the opening of canister 102. The canister is grasped and the protruding portion of ball 20 is placed against a flat surface, such as a wall or tabletop. Pressure is applied on the canister until the rim of the opening contacts the flat surface. The pressure causes the indicator arm 110 to be deflected. The amount of deflection is a function of the rigidity of ball 20.
20 This, in turn, is a function of the internal pressure in ball 20. A fresh ball, having an internal pressure established at the time of manufacture, will provide the greatest deflection of indicator arm 110. Over the life span of the ball, the pressure decreases and the amount of deflection is correspondingly less. At some point, the pressure decreases to an extent that the ball is no longer considered playable. The playing condition of ball 20 is thus ascertained by the deflection of indicator arm 110 as seen by the
25 position of indicator tip 112 viewed through the transparent wall of canister 102. The wall of canister 102 may be provided with a scale or other indicia by which the deflection of indicator arm 110 may be measured. The scale may provide a quantitative measure of ball condition or may simply provide a pass/fail indication. In one embodiment, canister 102 may be provided with a frosted ring or band surrounding support means 104. The frosted band may extend down the side of canister 102 far
30 enough to obscure indicator tip 112 in all positions except when deflected by a ball in playable condition. Thus, when a ball is tested, the appearance of indicator tip 112 below the frosted band provides an indication that the ball is in playable condition.

[0024] An individual ball 20 may be easily tested for playing condition as described above. The invention also facilitates rapid testing of a plurality of balls, such as may be required, for example,

by a pro shop. This is easily accomplished by placing the balls to be tested on a flat surface, such as a tabletop. Canister **102**, with ball-testing disk **106** installed, is then simply pressed down on each of the balls in succession. The playing condition of the ball is observed with indicator tip **112** and the ball may then be kept or discarded in accordance with its indicated playing condition. Pressure on the
5 canister may be released to roll the ball around on the supporting surface to bring the point **111** of disk **106** into contact with the ball at multiple locations on the surface of the ball. Thus, a ball may be tested at the multiple locations to determine an "average" playing condition. This also allows the ball to be tested at an optimum location, such as on a seam. Optionally, the sport balls may be provided with a marking, either at the time of manufacture or subsequently, to indicate a test location so as to enhance
10 repeatability of the test.

[0025] It will be recognized that the above-described invention may be embodied in other specific forms without departing from the spirit or essential characteristics of the disclosure. Thus, it is understood that the invention is not to be limited by the foregoing illustrative details, but rather is to be defined by the appended claims.